From: Alissa Oppenheimer
To: Wilson, Aimee
Cc: Patrick Murin; "Lisa Chavarria"
Subject: FW: Draft GHG PSD Permit for Chamisa CAES at Tulia
Date: Sunday, January 26, 2014 9:21:52 AM
Attachments: NG purge emissions - rev.pdf

Aimee,

Here are our answers to your questions of January 15.

Use of Leakless Equipment - These technologies include, among others, complete elimination of flanged or threaded connections by substituting welded connections in piping systems, and the use of "leakless" valves with diaphragms or bellows seals in place of conventional stem glands. Some of this leakless technology is technically infeasible. For example, diaphragm valves are not available for the high pressures in gas supply systems. Other leakless technology are impracticable and expensive. For example, the complete elimination of flanges and threaded connections in the fuel system will significantly increase the cost of initial installation, as well as cause increased downtime for maintenance. Maintenance or replacement of system components would require literally cutting them out of the piping system, then welding in new or refurbished components with expensive and difficult weld quality checks required in-situ. Components such as "leakless" valves are significantly more expensive than typical valves with conventional seals that are currently used in fuel gas supply systems.

Although we do not have an exact costs comparison between the conventional versus a leakless fuel supply system, we estimate equipment cost alone to amount to several hundred thousand dollars. Over the course of a 10-year period, the increased capital and operating costs would be projected as high as a million dollars, or $100,000/year. Now, we have estimated fugitive emissions to release a maximum of 84.67 tons/yr of. Assuming that all of these emissions were eliminated by leakless technologies, and assuming that the cost of these leakless technologies were only $25,000/year – which is only one-quarter of the likely true cost - the cost effectiveness of the leakless technologies would be $295/ton of CO_2e. We suggest that cost effectiveness value is clearly unreasonable.

Use of LDAR Program - Leak monitoring quarterly using instrument monitoring would cost approximately $1,500 per quarter or $6,000 annually. Leak monitoring using camera/remote sensing would cost approximately $4,000 per quarter or $16,000 annually. Leak repair costs are estimated to be approximately $5,000/yr. Costs for instrumental or remote monitoring of leaks, and their repair, would thus cost $11,000 to $21,000 annually. For an overall reduction of 85% of the CO_2-e emissions from equipment leaks, this would result in a cost effectiveness of $150-290/ton CO_2e. The specific 28 LAER program credits a 97% control efficiency for valve leak reduction and a 75% control efficiency for flange/connector reduction. With an overall control efficiency of about 92%, costs for an 28 LAER LDAR program would be $140/ton CO_2e, which we suggest is also unreasonable.

Use of Portable Flare to Control Maintenance Purges – Gas volumes in the system will be minimized through use of the shortest and smallest diameter line sizes consistent with the turbine performance requirements, and components such as filters and valves will be selected to maximize intervals between scheduled service and to minimize entrapped volumes of gas. Through careful design and component selection, system purges for maintenance will be required only once per quarter. The system will be designed so that components that may require more frequent service can be isolated, minimizing the volume of gas that may be lost during maintenance operations. As shown in the attachment, we have revised our calculations to reflect a reduced volume of released gas per purge event, and have also updated the calculation of CO_2e to reflect the revised global warming factor for methane. The revised calculation shows an annual release of 21.26 tons/yr CO_2e.

As presented in the permit application, flaring would reduce CH_4 and other hydrocarbon emissions from maintenance purges by 98% but CO_2-e emissions would be reduced only by 81% since the combustion of the hydrocarbon emissions would result in the formation of CO_2 emissions. Rental and operation of a portable flare once per quarter for the maintenance purge would cost approximately $3,500 per quarter or $14,000 annually. For an 81% overall reduction in CO_2-e emissions, and using the revised emission estimation, results in a cost effectiveness of $810/ton CO_2e. We suggest that cost effectiveness value is clearly unreasonable. We do not believe that applying any additional control to control maintenance purges is warranted because of its higher cost per ton of CO_2e emission reduction, and due to the relatively small amount of CO_2e emissions overall. CO_2e emissions of 21.26 tons/yr would comprise less than 0.01% of the total facility emissions of CO_2e.

Aimee, if you have any follow-up questions to these responses, or if you have any further questions, please contact me.

Alissa

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From: Wilson, Aimee [mailto:Wilson.Aimee@epa.gov]
Sent: Wednesday, January 15, 2014 2:59 PM
To: Alissa Oppenheimer
Subject: RE: Draft GHG PSD Permit for Chamisa CAES at Tulia

Alissa,

I'm going over the comments from HQ on the draft permit and SOB. One item they have flagged is on the use of leakless technologies for the fugitive emissions. We've been getting a lot of comments from Sierra Club on this issue. Can you provide some cost data to show that it is economically prohibitive? Also the 28LAER LDAR program was also eliminated, can you provide a cost in $/ton to support the assertion that it's not economically practicable? Please see the APEX SOB (attached) for an example of the information requested.

They also do not agree with the elimination of the use of a portable flare for controlling maintenance purges. Can you provide any additional information to support elimination, or think you could use a portable flare. The cost is very minimal. Also, the purges do not match what we permitted for APEX – they claimed only 1 purge per year and the emissions are estimated at 0.36 TPY CO_2e.

I've attached revised documents. Let me know if you have any questions.

Thanks,
Aimee

From: Alissa Oppenheimer [mailto:ao@chamisaenergy.com]
Sent: Wednesday, January 15, 2014 8:10 AM
To: Wilson, Aimee
Subject: RE: Draft GHG PSD Permit for Chamisa CAES at Tulia

Glad you found it. Thanks!

Alissa Oppenheimer
Managing Director
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On Jan 15, 2014 8:07 AM, "Wilson, Aimee" <Wilson.Aimee@epa.gov> wrote:
I found the email. Sorry, I guess I overlooked it. I'll review today.

Thanks,
Aimee

From: Alissa Oppenheimer [mailto:ao@chamisaenergy.com]
Sent: Wednesday, January 15, 2014 7:58 AM
To: Wilson, Aimee
Subject: RE: Draft GHG PSD Permit for Chamisa CAES at Tulia

Hi Aimee,

I emailed our material to you last Friday. I will resend shorrtly.

Alissa

Alissa Oppenheimer
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On Jan 15, 2014 7:10 AM, "Wilson, Aimee" <Wilson.Aimee@epa.gov> wrote:
Alissa,

When do you expect to have your review completed? Do I need to arrange a conference call?

Thanks,
Aimee

From: Wilson, Aimee
Sent: Tuesday, December 31, 2013 3:23 PM
To: 'Alissa Oppenheimer'
Subject: Draft GHG PSD Permit for Chamisa CAES at Tulia

Alissa,

I was given approval to go ahead and send you the draft permit and statement of basis for your review. Please provide and comments and additional information that may be needed to support the permit record as a standalone submittal.

Please let me know if you want to have a conference call or a meeting to go over the documents and discuss any issues.

Thanks,
Aimee

Emission Bases and Calculations (Revised 1/2014)

Fuel Gas Volume Lost in Purge, acf/purge:	500
Maximum Fuel Gas Pressire before purge, psig:	300
Minimum Fuel Gas Temperature, °F:	50
Maximum Purges per Hour:	1
Maximum Purges, per year:	4
Calculated Volume per Purge, scf/purge:	10914
Calculated Lb-Moles per Purge, lb-mol/purge:	28.8
Calculated Lb-Moles per Year, lb-mols/year:	115.2

	Gas Comp., % vol	Molecular Weight	lbs/hr, lbs/purge	tons/yr	CO_2-e Factor, ton/ton*	CO_2-e, lbs/hr	CO_2-e, tons/yr
Nitrogen	3.866	28.01	31.2	0.062	N/A	N/A	N/A
Carbon Dioxide	0.374	44.01	4.7	0.009	1	4.7	0.009
Methane	91.517	16.04	422.8	0.85	25	10570	21.25
Ethane	9.932	30.07	86	0.17	N/A	N/A	N/A
Propane	2.458	44.09	31.2	0.062	N/A	N/A	N/A
i-Butane	0.164	58.12	2.7	0.005	N/A	N/A	N/A
n-Butane	0.296	58.12	5	0.01	N/A	N/A	N/A
i-Pentane	0.025	72.15	0.5	0.001	N/A	N/A	N/A
n-Pentane	0.023	72.15	0.5	0.001	N/A	N/A	N/A
Hexane	0.014	86.17	0.3	0.001	N/A	N/A	N/A
Heptanes+	0.015	100.19	0.4	0.001	N/A	N/A	N/A
VOC	2.995		40.6	0.081	N/A	N/A	N/A
Total						10575	21.26

Note: Highest values from representative sampling used for each gas component, so total composition exceed 100%.
*GHG Warming Potential Equivalency Factor from 40 CFR Part 98, Subpart A, Table A-1.

Calculation Formulae:

Calculated Volume per Purge [=] (acf/purge) X [(300 + 14.7) psia / 14.7 psia] X [(60 + 460) deg R / (50 + 460) deg R]
Calculated Lb-Moles per Purge [=] (scf/purge) X (1 lb-mole /379 scf)
Calculated Lb-Moles per Year [=] (lb-moles/purge) X (purges/year)
Calculated Lbs/Day or Hour [=] (lb-moles/purge) X (purges/day or hour) X (% Vol / 100 %) X (MW lbs / lb-mole)
Calculated Tons/Year [=] (lbs/day, hour, or purge) X (purges/year) X (1 ton / 2000 lbs)